

A survey of the *Amerioppia* species (Acari, Oribatei)

By

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Abstract. A short diagnosis of the genus *Amerioppia* HAMMER, 1961 is given. Identification keys to eight artificial species groups and 41 known species are added.

The genus *Amerioppia* was established by HAMMER (1961). Generic diagnosis:

Five pairs of genital setae. Nine or ten pairs of notogastral setae: setae c_2 ($= tu$) present or absent. Prodorsum without costula. Notogaster without crista. Sensillus fusiform or lanceolate. Interlamellar setae absent. Exostigmatal setae strong, ciliate. Rostral setae originating on the upper side of the rostrum. Three (or two) pairs of interbothridial sigilla present. Lyrifissuræ *iad* in adanal position: near to anal plates. Genital plates smaller than anal plates, slightly narrowing forwards.

Type-species: *Amerioppia rudentigera* HAMMER, 1961.

I have found 41 species in the literature that may be placed in the genus *Amerioppia*. The great majority of the species seems to be well established, still at places the differences are hard to describe and merely quantitative. My opinion is that in the descriptions and drawings of the Oribatida species published in the last 30 years a huge mass of information is hidden that should be brought to light. In case a drawing is made by the help of the Abbé apparatus and good care was taken in tracing, the author fixes such information that will only be used in the future when separating the species. The description in oribatidology is far more important than in any other group of animals. The types, especially those of old authors, have been preserved on permanent slides. With the passing time some are squashed and only fragments are recognizable. In such cases that original description harbours a great deal of information more than the squashed specimen. One of the aims of my contribution is to present an identification key which was constructed on these bases. Although some of the data (e.g. the length of setae, the distance of insertion points) might seem to be uncertain, practice shows that this kind of a key much facilitates identification.

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My other aim is to throw light on some interesting trends of distribution of the *Amerioppia* species. Although the continents are not equally explored from the point of view of oribatid mites, we have such a quantity of information that allows to ascertain, at least, the principal trends of distribution. The picture concerning the 41 *Amerioppia* species is quite surprising. The majority of the species lives in the higher altitudes of the Neotropical and the Ethiopian Regions, as well as in the southernmost parts of the southern continents. There are 31 such species, a total of 75%. The remaining 10 species (25%) are found in the Holarctic and the Oriental Regions, 2 and 5 species, respectively, and in the Pacific region, where 3 species are found. The former 31 species live on the parts of Gondwana while the rest in Laurasia. Out of the 10 species, five live, as do the 31 species, in the Southern Hemisphere. Consequently, we may establish on the basis of the 41 known *Amerioppia* species, that the majority lives in the higher mountains of the Southern Hemisphere; especially in the tropical moss forests and montane forests, where the diversity of the species is the highest. It is quite likely that these were the places where speciation took place at the highest rate in the historical geological epochs.

Identification keys to the species groups

- 1 (2) Sensillus bilaterally ciliate 1
barrancensis group
- 2 (1) Sensillus without cilia (exceptionally with very small and short spines or granula).
- 3 (6) Notogastral setae long: as long as or longer than the distance of *la* – *lm*.
- 4 (5) Sensillus long: as long as or longer than the distance of bothridia .. 3
decemsetosa group
- 5 (4) Sensillus medium long or short: shorter than the distance of bothridia 2
longicoma group
- 6 (3) Notogastral setae medium long or short: shorter than the distance of *la* – *lm*.
- 7 (12) Notogastral setae short: shorter than the half distance of bothridia.
- 8 (9) Sensillus long: as long as or longer than the distance of bothridia .. 4
longiclava group
- 9 (8) Sensillus medium long or short: shorter than the distance of bothridia.
- 10 (11) Sensillus short: with short stalk and globular head 5
espeletiarum group
- 11 (10) Sensillus medium long: with longer stalk and gradually dilated head 6
chilensis group
- 12 (7) Notogastral setae medium long: longer than the half distance of *la* – *lm* (but shorter than the distance of *la* – *lm*).
- 13 (14) Sensillus long: as long as or longer than the distance of bothridia . 7
lanceolata group
- 14 (13) Sensillus medium long or short: shorter than the distance of bothridia 8
rudentigera group

1. barrancensis group

- 1 (2) Rostral setae originating far from each other, almost parallel. Interlamellar region punctulate. Sensillus setiform, with very slightly dilated distal half. L : 293 μm ; W : 153 μm . — USA
minuta (EWING, 1917)
- 2 (1) Rostral setae originating near each other, geniculate.
- 3 (4) Lamellar lines slightly converging. Apical half of sensillus well dilated. L : 300 μm ; W : 172 μm . — Peru, Mexico
barrancensis (HAMMER, 1961)
- 4 (3) Lamellar lines parallel. Distal half of sensillus very slightly dilated.
- 5 (6) Short median line between the light spots in the interlamellar area present. Setae p_1 only a little shorter than r_1 . L : 260 μm ; W : 184 μm . — Java
javensis HAMMER, 1980
- 6 (5) Median line between the light spots in the interlamellar area absent. Setae p_1 more than twice shorter than r_1 . L : 256 — 279 μm ; W : 145 — 152 μm . — Paraguay
paraguayensis (BALOGH & MAHUNKA, 1981)

2. longicoma group

- 1 (2) Lamellar setae long: as long as the distance of *le-ro*. Setae c_2 absent. Setae l_p twice longer than r_1 . Larger species, L : 520 μm ; W : 280 μm . — Bolivia, 4900 — 5400 m
longicoma HAMMER, 1958
- 2 (1) Lamellar setae short: distance of *le-ro* more than twice longer than lamellar setae. Setae c_2 present. Setae l_p as long as or only a little longer than r_1 . Smaller species, L : 291 — 307 μm ; W : 160 — 168 μm . — Tanzania
extrusa MAHUNKA, 1983

3. decemsetosa group

- 1 (4) Setae h_2 thrice or more longer than h_1 .
- 2 (3) Setae $p_1 — p_3$ short, not longer than h_1 . The five long notogastral setae (la , lm , l_p , h_2 and h_3) rigid. L : 246 μm ; W : 139 μm . — Columbia, 2700 m
sturmi P. BALOGH, 1984
- 3 (2) Setae $p_1 — p_3$ longer than h_1 . The five long notogastral setae with flagellate end. L : 291 — 295 μm ; W : 162 — 170 μm . — Fiji Islands
aelleni MAHUNKA, 1982
- 4 (1) Setae h_2 either as long as or, at most, twice longer than h_1 .
- 5 (6) Setae h_1 as long as h_2 . Lamellar line present. L : 281 — 310 μm ; W : 150 — 160 μm . — Ethiopia
polygonata MAHUNKA, 1982

- 6 (5) Setae h_1 shorter than h_2 . Lamellar line absent.
 7 (8) Setae c_2 absent. Alveoli of rostral setae almost touching. The light spots in the interlamellar area of different sizes: the first and second pairs smaller, the third ones larger. Only the distal third of sensillus slightly dilated. L : 265 μm . — Sahara **flagellata HAMMER, 1975**

8 (7) Setae c_2 present. Alveoli of rostral setae well separated. The light spots in the interlameller area almost of the same size. The distal half of sensillus very slightly dilated. L : 370 μm ; W : 199 μm . — Samoa **decemsetosa HAMMER, 1973**

4. *longiclava* group

- 1 (4) Setae c_2 absent. Setae p_1 longer than p_2 and p_3 . Two very similar species.

2 (3) The end of sensillus with a long and gradually attenuated tip. Vertical separating lines between the light spots of interlamellar area absent.
 $L : 300 - 320 \mu\text{m}$; $W : 180 \mu\text{m}$. — Patagonia, New Zealand
longiclava HAMMER, 1962

3 (2) The end of sensillus with short, abruptly attenuated tip. Two vertical separating lines between the light spots of interlamellar area present.
 $L : 245 \mu\text{m}$; $W : 149 \mu\text{m}$. — Fiji
vicina HAMMER, 1971

4 (1) Setae c_2 very short but present. Setae p_1 to p_3 of the same length. Two very similar species.

5 (6) Rostral setae geniculate. $L : 250 \mu\text{m}$; $W : 139 \mu\text{m}$. — Java
ventrosquamosa HAMMER, 1980

6 (5) Rostral setae only slightly curved. $L : 320 - 360 \mu\text{m}$; $W : 180 - 208 \mu\text{m}$.
— Peru
chavinensis HAMMER, 1961

5. *espeletiarum* group

- 1 (2) Notogaster outside of setae c_2 each with an oblique longitudinal line, resembling a crista. L : 360 μm . — El Salvador *salvadorensis* (WOAS, 1986)

2 (1) Notogaster outside of setae c_2 without an oblique longitudinal line. Two extremely similar species.

3 (4) Prodorsal and notogastral setae smooth. L : 328 – 414 μm ; W : 189 – 230 μm . — Columbia, 3700 m, *Espeletia* *espeletiae* P. BALOGH, 1984

4 (3) Prodorsal and notogastral setae finely ciliate. L : 340 μm ; W : 180 μm — Germany (Schwarzwald) *badensis* (WOAS, 1986)

6. chilensis group

- 1 (4) Setae h_2 relatively near to each other: distance of $h_2 - h_2$ less than twice longer than distance of $h_1 - h_1$ and always much shorter than that of $lm - lm$.
2 (3) Setae c_2 present. Alveoli of rostral setae almost touching. Lamellar line present. L : 285–299 μm ; W : 152–166 μm . — Columbia, 4000 m *cocuyana* P. BALOGH, 1984
- 3 (2) Setae c_2 absent. Alveoli of rostral setae well separated. Lamellar line absent. L : 330 μm ; W : 190 μm . — Bolivia, 4000 m *notata* (HAMMER, 1958)
- 4 (1) Setae h_2 far from each other: distance of $h_2 - h_2$ at least thrice longer as distance of $h_1 - h_1$ and always longer than that of $lm - lm$.
- 5 (6) Sensillus lanceolate: the lanceolated distal part as long as the stalk. L : 300 μm ; W : 150 μm . — Peru, 3750 m *paripilis* HAMMER, 1961
- 6 (5) Sensillus with a fusiform head: the dilated distal part shorter than the stalk.
- 7 (8) Sensillus finely granulate. The three pairs of light spots in the interlamellar area connected with united circular field. Setae p_1 to p_3 medium long, curved ventrally. L : 292–310 μm ; W : 158–176 μm . — Tanzania *foveolata* MAHUNKA, 1984
- 8 (7) Sensillus smooth. The three pairs of light spots in the interlamellar area well separated. Setae p_1 to p_3 short. L : 320 μm ; W : 180 μm . — Chile, Puerto Montt *chilensis* HAMMER, 1962

7. lanceolata group

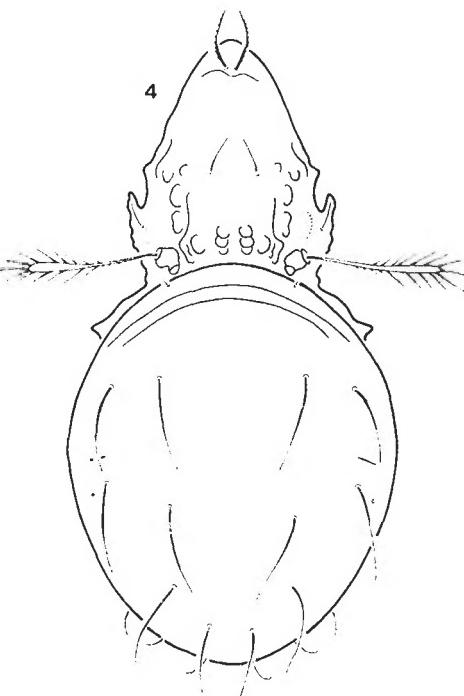
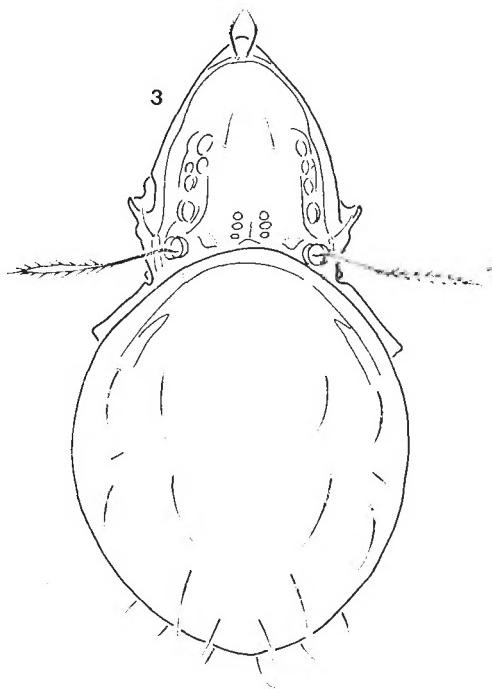
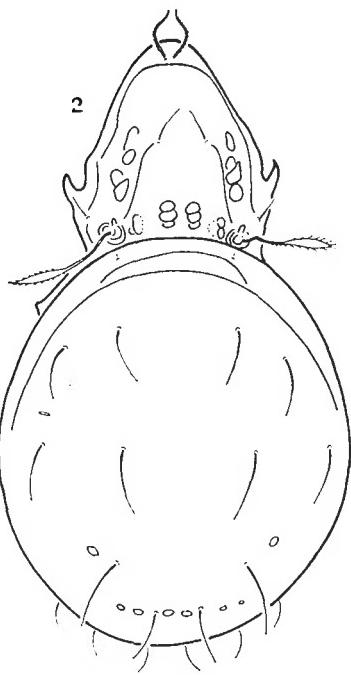
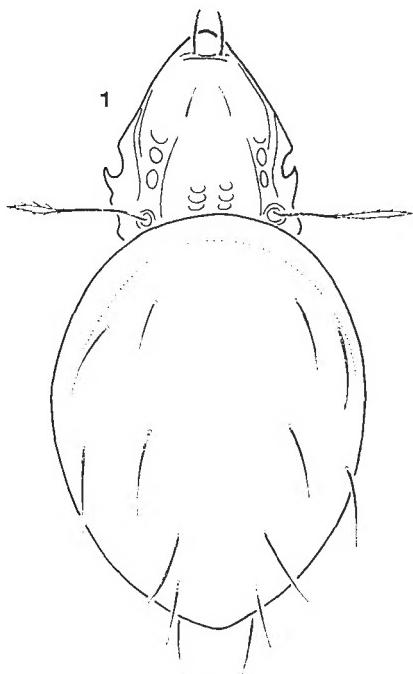
- 1 (4) Setae c_2 absent.
- 2 (3) Sensillus much longer than the distance of bothridia. Six long notogastral setae (la , lm , lp , h_1 , h_2 and h_3) of the same length. L : 350 μm ; W : 170 μm . — Argentina *lanceolata* (HAMMER, 1958)
- 3 (2) Sensillus as long as the distance of bothridia. Two pairs of notogastral setae (la and lm) long, the remaining ones much shorter. L : 350 μm ; W : 210 μm . — Bolivia, 3180 m *rotunda* (HAMMER, 1985)
- 4 (1) Setae c_2 present.
- 5 (6) Sensillus much longer than the distance of bothridia, with a pointed, long tip and with very short, scattered cilia. Setae h_2 twice longer than h_1 and as long as p_1 . L : 366–405 μm ; W : 230–247 μm . — Rhodesia *ankae* MAHUNKA, 1974

- 6 (5) Sensillus only a little longer than the distance of bothridia, without long and pointed tip. Setae h_2 as long as h_1 and much longer than p_1 .
 7 (3) Setae p_1 to p_3 extremely short, hardly visible. Sensillus with gradually dilated and apically rounded tip. L : 287 – 353 μm ; W : 172 – 197 μm . — West Africa
deficiens (BALOGH, 1959)
- 8 (7) Setae p_1 to p_3 not very short. Sensillus only slightly lanceolate.
- 9 (10) Surface of prodorsum finely punctate; the anterior part finely striped. The whole surface is finely punctate, along the borders finely striped. L : 360 μm ; W : 296 μm . — Peru, 3000 m.
pectigera HAMMER, 1961
- 10 (9) Surface of prodorsum and notogaster smooth. L : 366 – 379 μm ; W : 223 μm . — East Africa
meruensis BALOGH, 1961

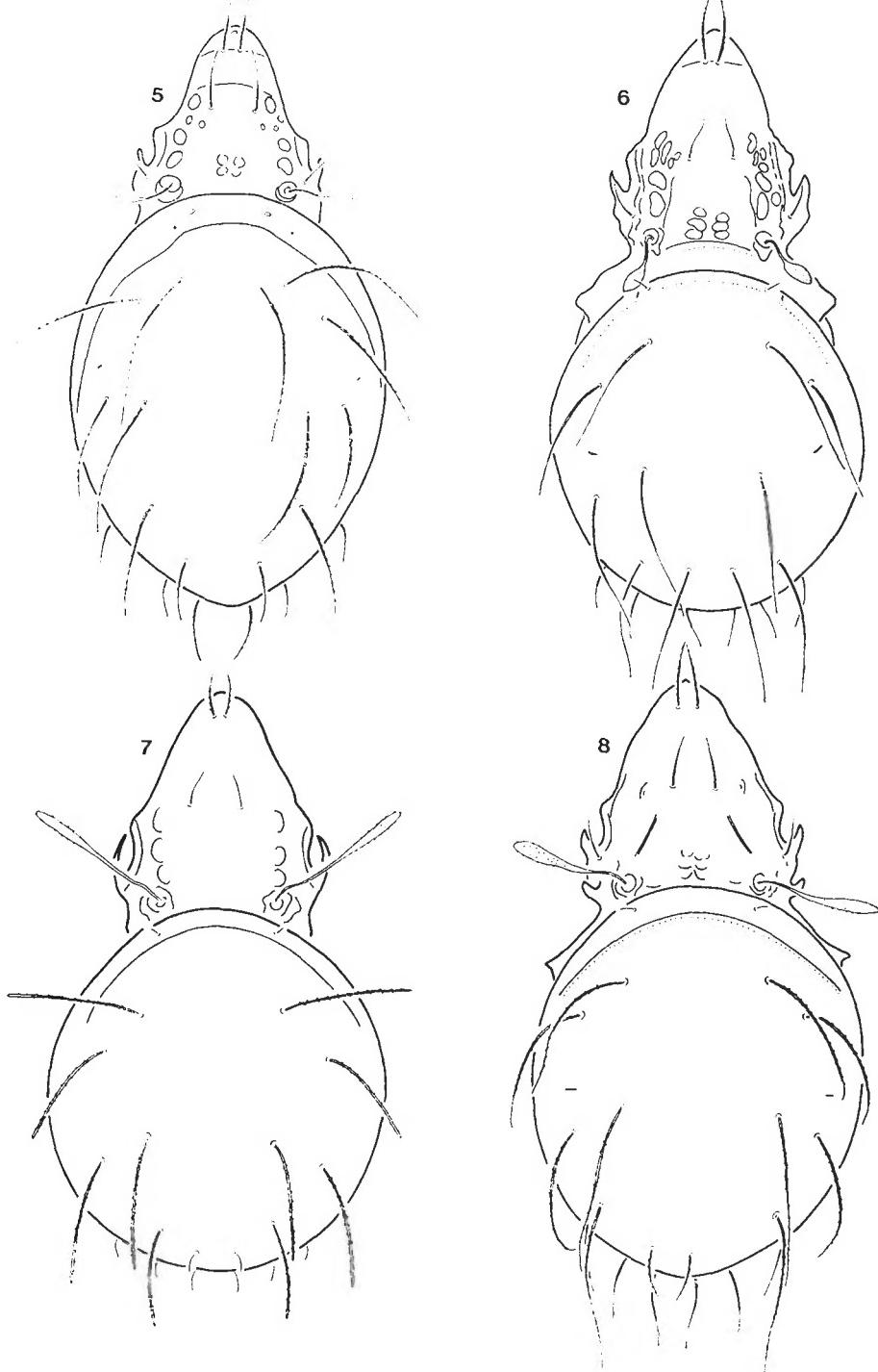
8. rudentigera group

- 1 (2) Seven pairs of notogastral setae (la , lm , lp , h_1 , h_2 , h_3 and p_1) long, with a dilated and fusiform tip. Setae c_2 present, small, p_2 and p_3 a little longer. Sensillus short, with a dilated head. L : 410 – 424 μm ; W : 236 – 250 μm . — Antilles: St. Lucia
extrema MAHUNKA, 1984
- 2 (1) Notogastral setae setiform, normal, without dilated tip.
- 3 (8) Setae c_2 absent.
- 4 (5) Setae h_1 shorter than h_2 . L : 340 μm ; W : 196 μm . — New Zealand, Fiji
woolleyi HAMMER, 1968
- 5 (4) Setae h_1 as long as h_2 .
- 6 (7) Prodorsum smooth. Smaller species. L : 450 μm ; W : 220 μm . — Bolivia, Peru, 4600 m.
trichosa (HAMMER, 1958)
- 7 (6) Prodorsum distinctly punctate. Larger species. L : 560 – 570 μm ; W : 340 – 350 μm . — Peru
trichosoides HAMMER, 1961
- 8 (3) Setae c_2 present.
- 9 (10) Rostral setae geniculate. There is an auriculate outgrowth on the medial side of bothridia. Sensillus very finely ciliate. L : 26P – 285 μm ; W : 150 – 170 μm . — Hong-Kong
interrogata MAHUNKA, 1976
- 10 (9) Rostral setae not geniculate. Bothridia without auriculate outgrowth.

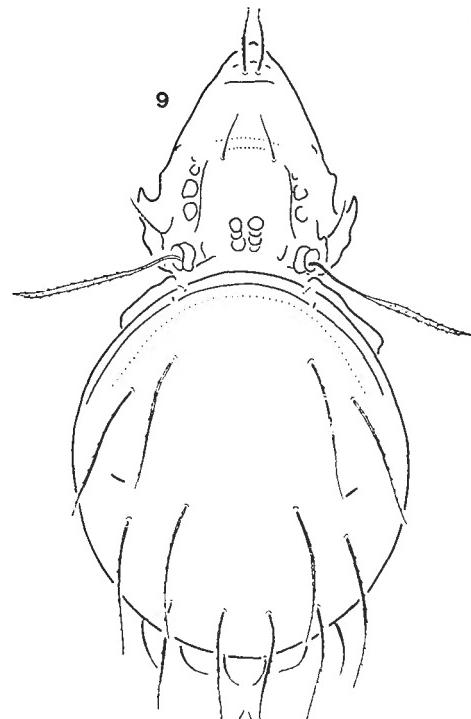
- 11 (12) Minute species, 260 μm long. Setae p_1 about twice longer than p_2 . L: 260 μm ; W: 150 μm . — Peru *minima* HAMMER, 1961
- 12 (11) Larger species, 320—770 μm long. Setae p_1 to p_2 of the same length.
- 13 (14) Giant, chestnut brown species, 770 μm . Notogastral setae rough and equally thick throughout. Prodorsum punctate. L: 770 μm ; W: 477 μm . Peru, 3550 m. *rudentigera* HAMMER, 1961
- 14 (13) Smaller and lighter species: 320—520 μm .
- 15 (16) Three pairs of notogastral setae: la , lm and lp longer than setae h . L: 450 μm ; W: 248 μm . — Peru, 3300 m. *hexapilis* HAMMER, 1961
- 16 (15) Five or six pairs of the notogastral setae of the same length.
- 17 (18) Setae h_1 shorter than h_2 , thus only five pairs of notogastral setae of the same length. L: 420 μm ; W: 226 μm . — Pakistan, 3000 m. *asiatica* HAMMER, 1977
- 18 (17) Setae h_1 as long as setae h_2 , thus six pairs of notogastral setae of the same length.
- 19 (20) Sensillus short, with short stalk and a broad, fusiform pointed head. L: 357—385 μm . W: 197—217 μm . — Columbia, 4640 m. *senecionis* P. BALOGH, 1984
- 20 (19) Sensillus longer, with a medium long stalk and gradually dilated fusiform head.
- 21 (22) Rostral setae near to each other: alveoli almost touching. Lamellar setae far behind: distance of $le-ro$ much longer than lamellar setae. L: 320—352 μm ; W: 184—212 μm . — South Africa *africana* KOK, 1967
- 22 (21) Rostral setae well separated. Lamellar setae ahead: distance of $le-ro$ as long as lamellar setae. L: 520 μm ; W: 323 μm . — Chile *similis* COVARROUBIAS, 1967



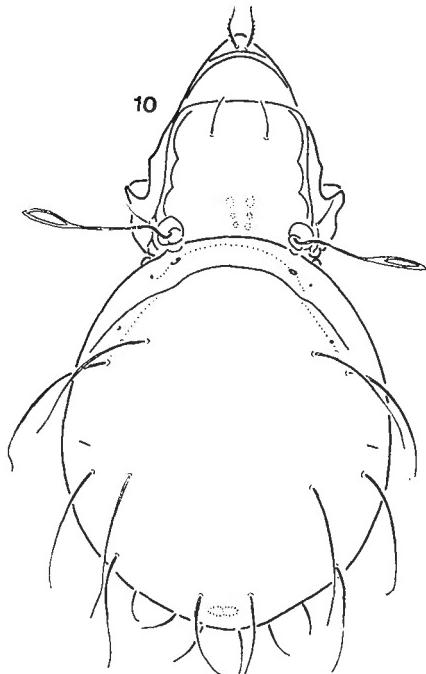
Figs. 1 – 4. 1: *Amerioppia minuta* (EWING, 1917); 2: *A. barrancensis* (HAMMER, 1961); 3: *A. javensis-HAMMER*, 1980; 4: *A. paraguayensis* (BALOGH & MAHUNKA, 1981)



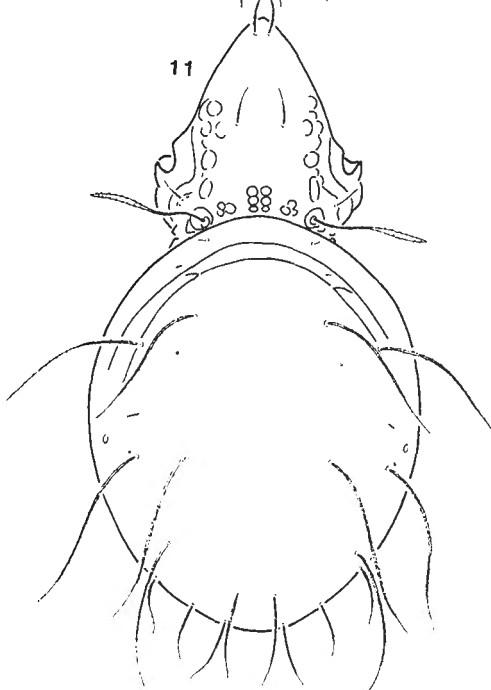
Figs. 5–8. 5: *Amerioppia longicoma* (HAMMER, 1958); 6: *A. extrusa* MAHUNKA, 1983; 7: *A. sturni* P. BALOGH, 1984; 8: *A. aelleni* MAHUNKA, 1982



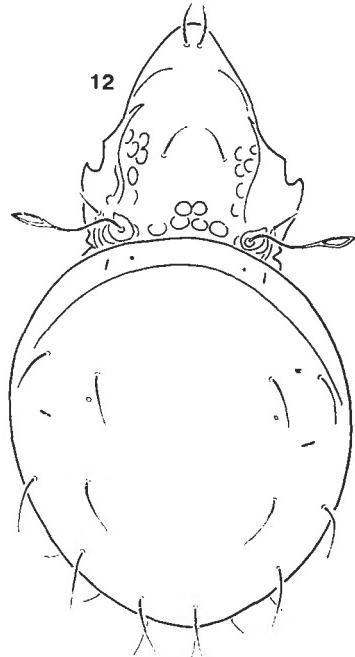
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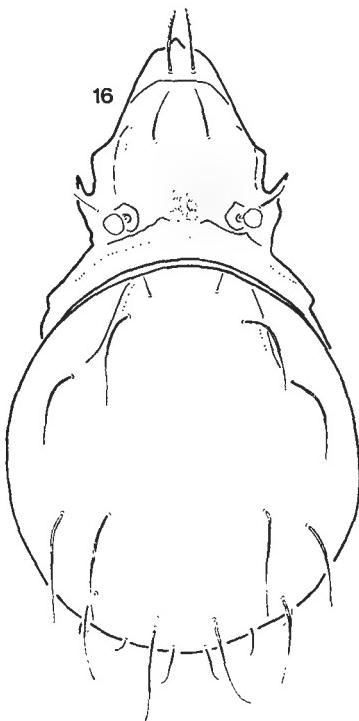
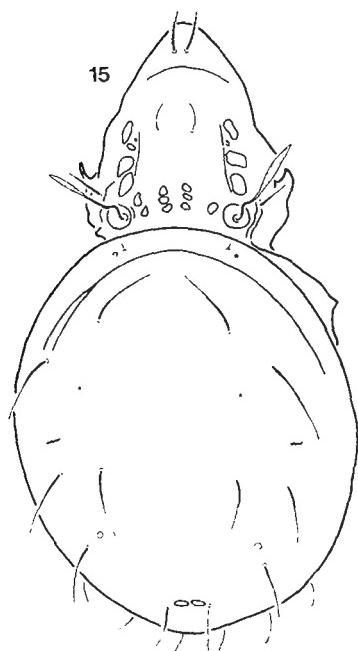
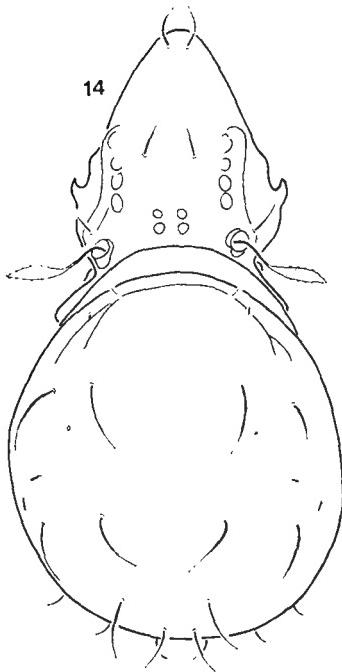
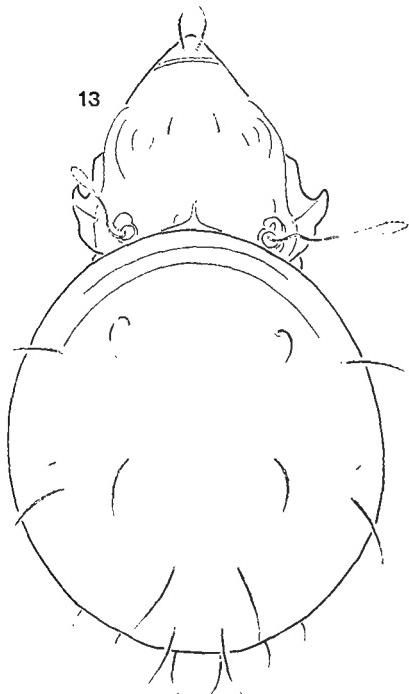


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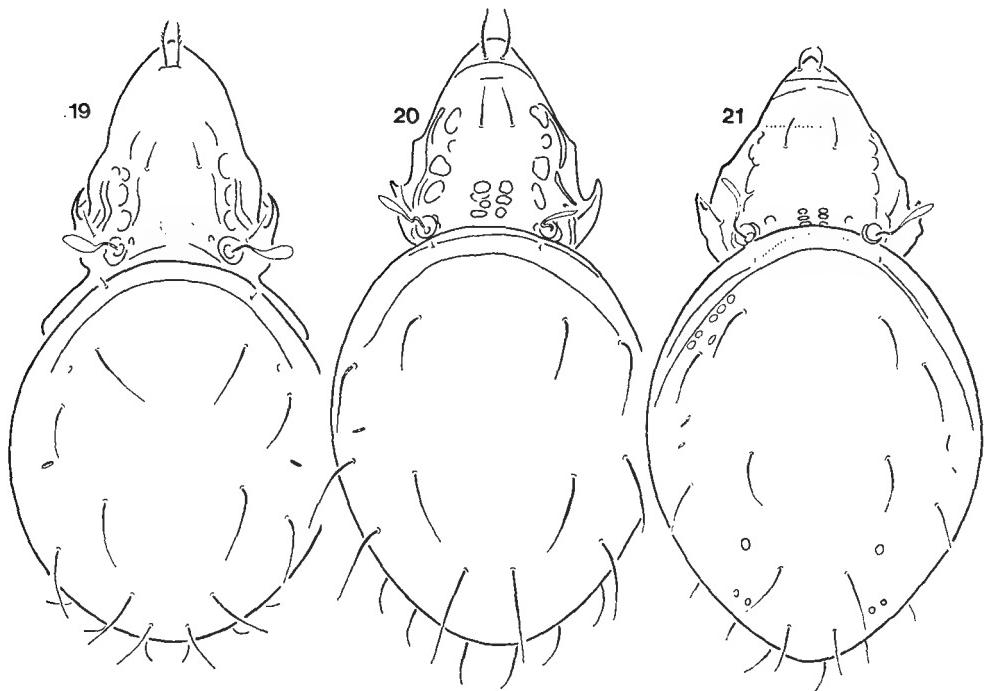
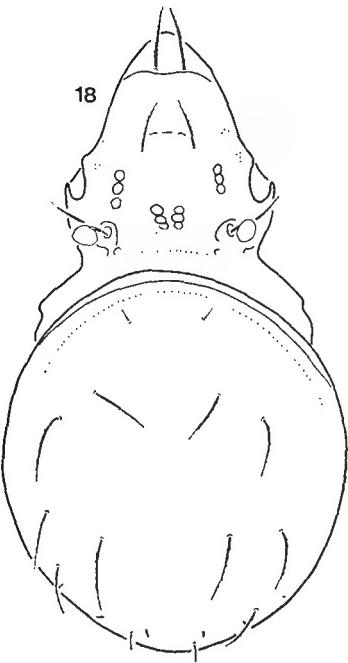
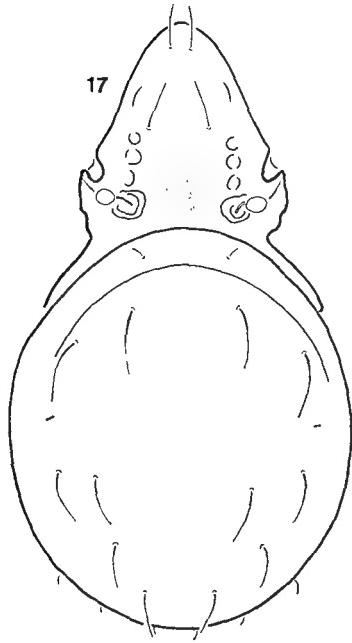


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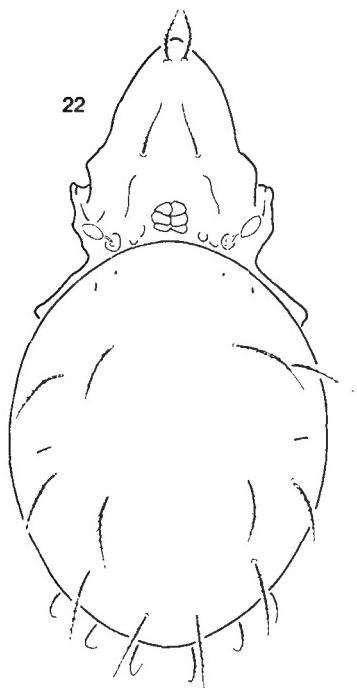
Figs. 9 – 12. 9: *Amerioppia polygonata* MAHUNKA, 1982; 10: *A. flagellata* HAMMER, 1975; 11: *A. decemsetosa* HAMMER, 1973; 12: *A. longiclava* HAMMER, 1962



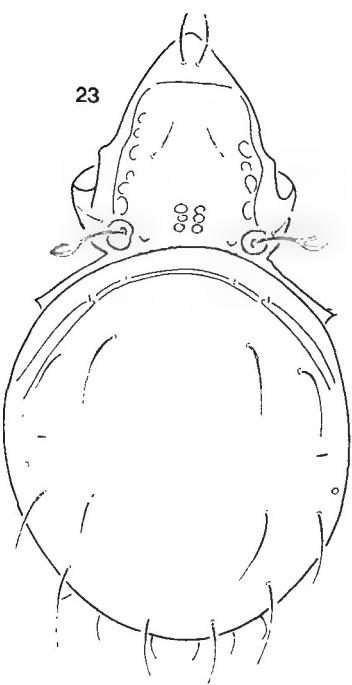
Figs. 13 – 16. 13: *Amerioppia ricina* HAMMER, 1971; 14: *A. ventrosquamosa* HAMMER, 1980; 15: *A. chaviensis* HAMMER, 1961; 16: *A. salvadorensis* (WoAS, 1986)



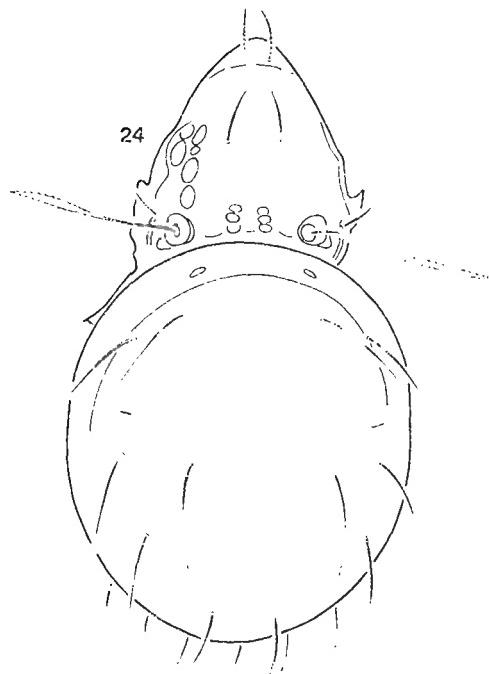
Figs. 17 – 21. 17: *Amerioppia espeletiae* P. BALOGH, 1984; 18: *A. badensis* (WOAS, 1986); 19: *A. co-cuyana* P. BALOGH, 1984; 20: *A. notata* (HAMMER, 1958); 21: *A. paripilis* HAMMER, 1961



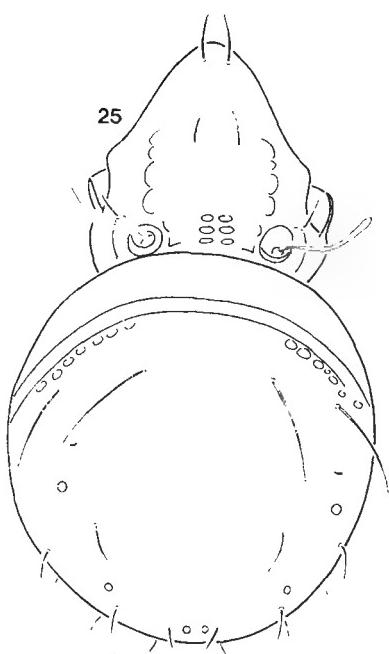
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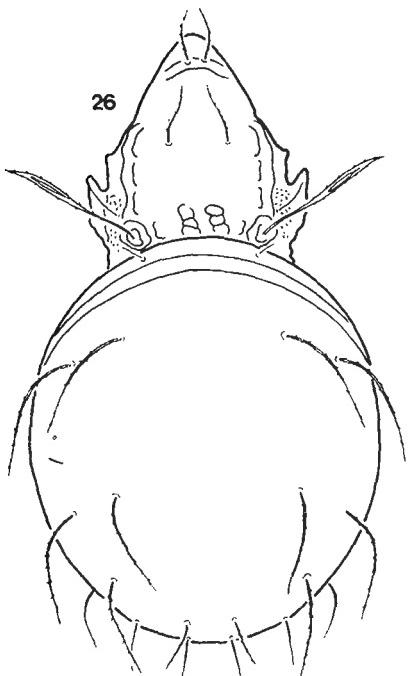


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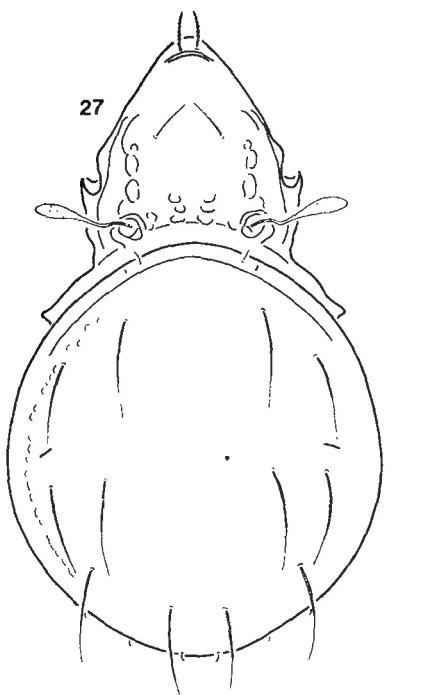


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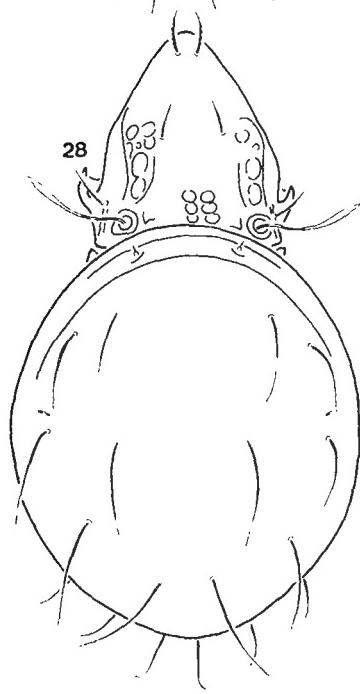
Figs. 22–25. 22: *Amerioppia foveolata* MAHUNKA, 1984; 23: *A. chilensis* HAMMER, 1962; 24: *A. lanceolata* (HAMMER, 1958); 25: *A. rotunda* (HAMMER, 1958)



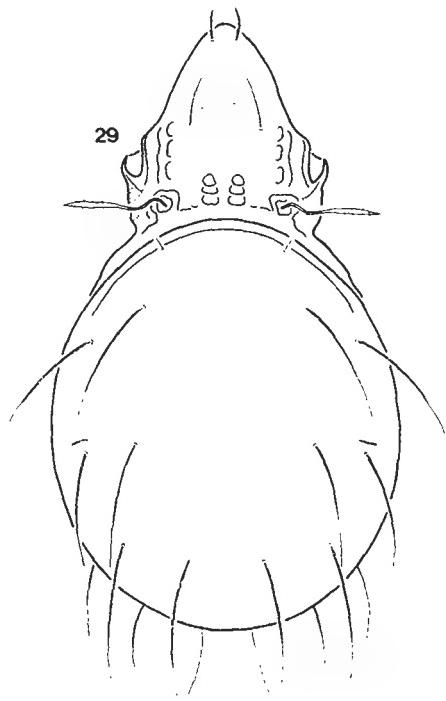
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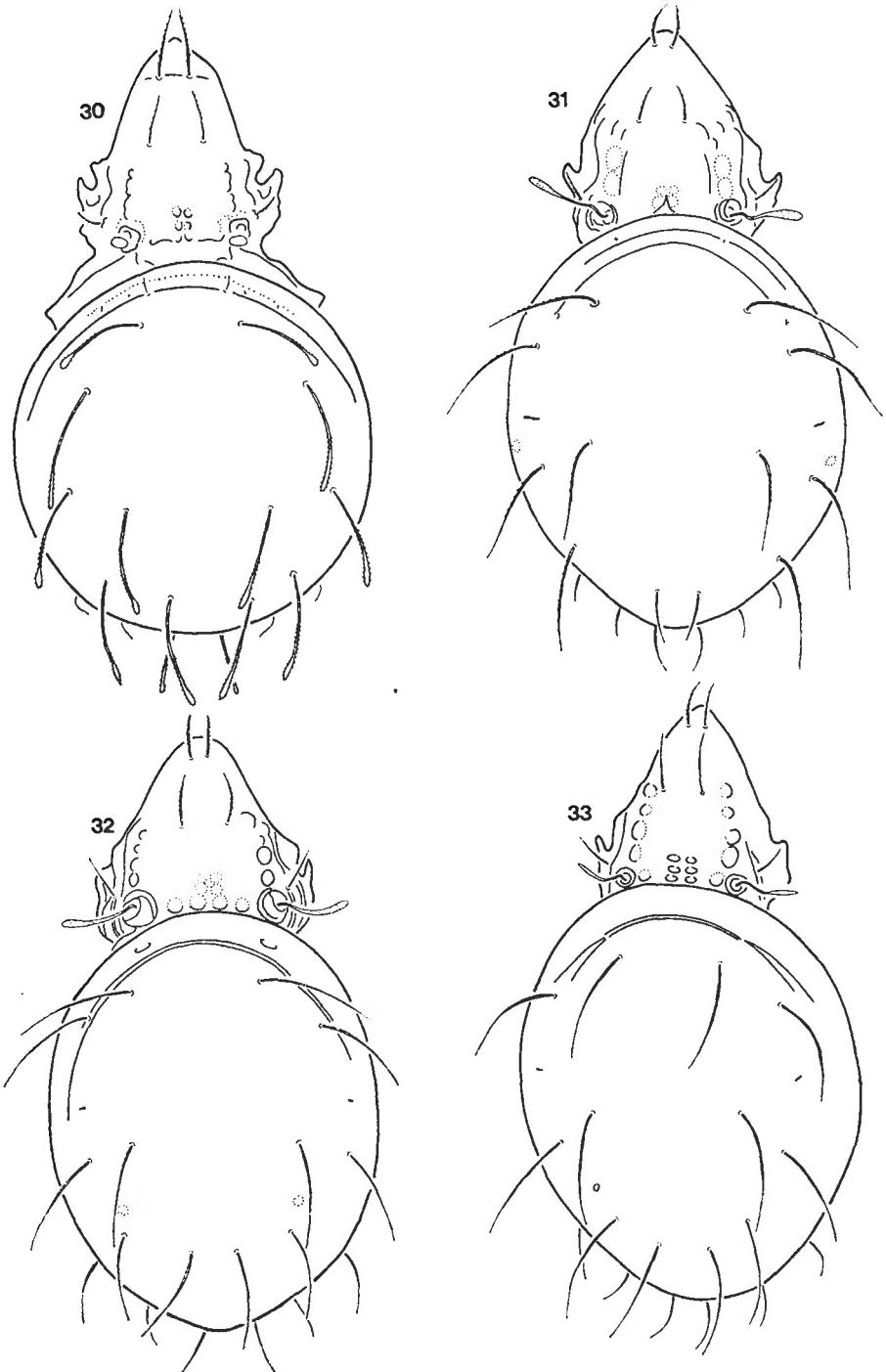


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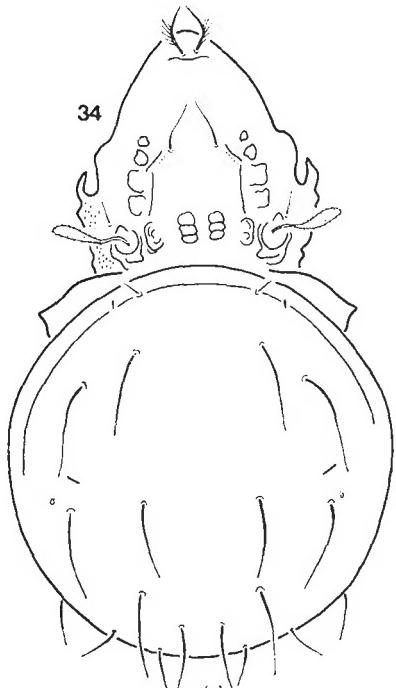


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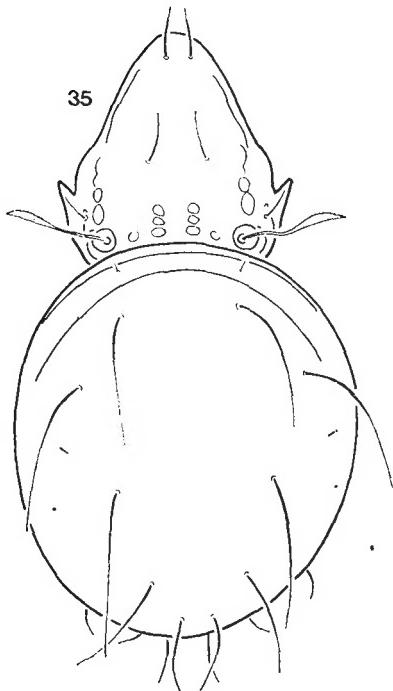
Figs. 26 – 29. 26: *Amerioppia ankae* MAHUNKA, 1974; 27: *A. deficiens* (BALOGH, 1959); 28: *A. pectinata* HAMMER, 1961; 29: *A. meruensis* BALOGH, 1961



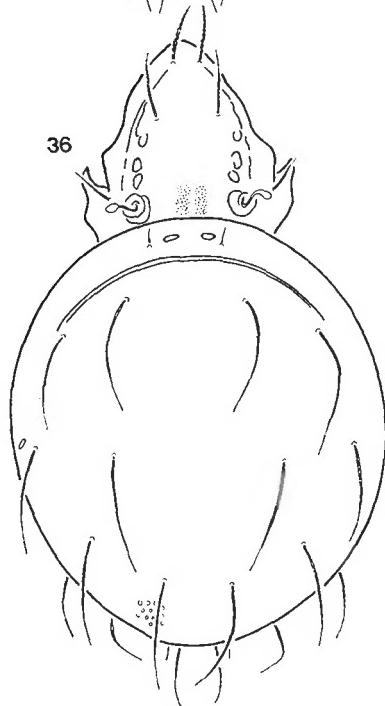
Figs. 30–33. 30: *Amerioppia extrema* MAHUNKA, 1984; 31: *A. woolleyi* HAMMER, 1968; 32: *A. trichosa* (HAMMER, 1958); 33: *A. trichosoides* HAMMER, 1961



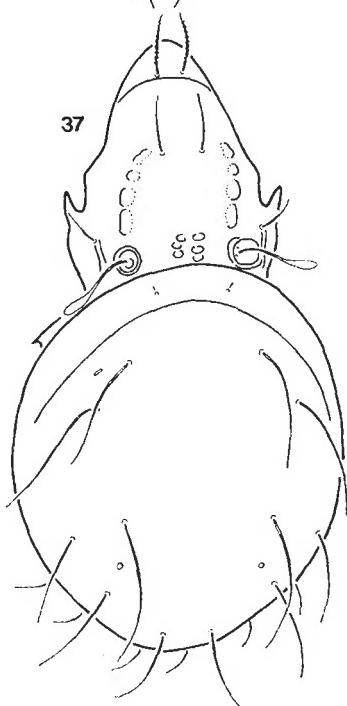
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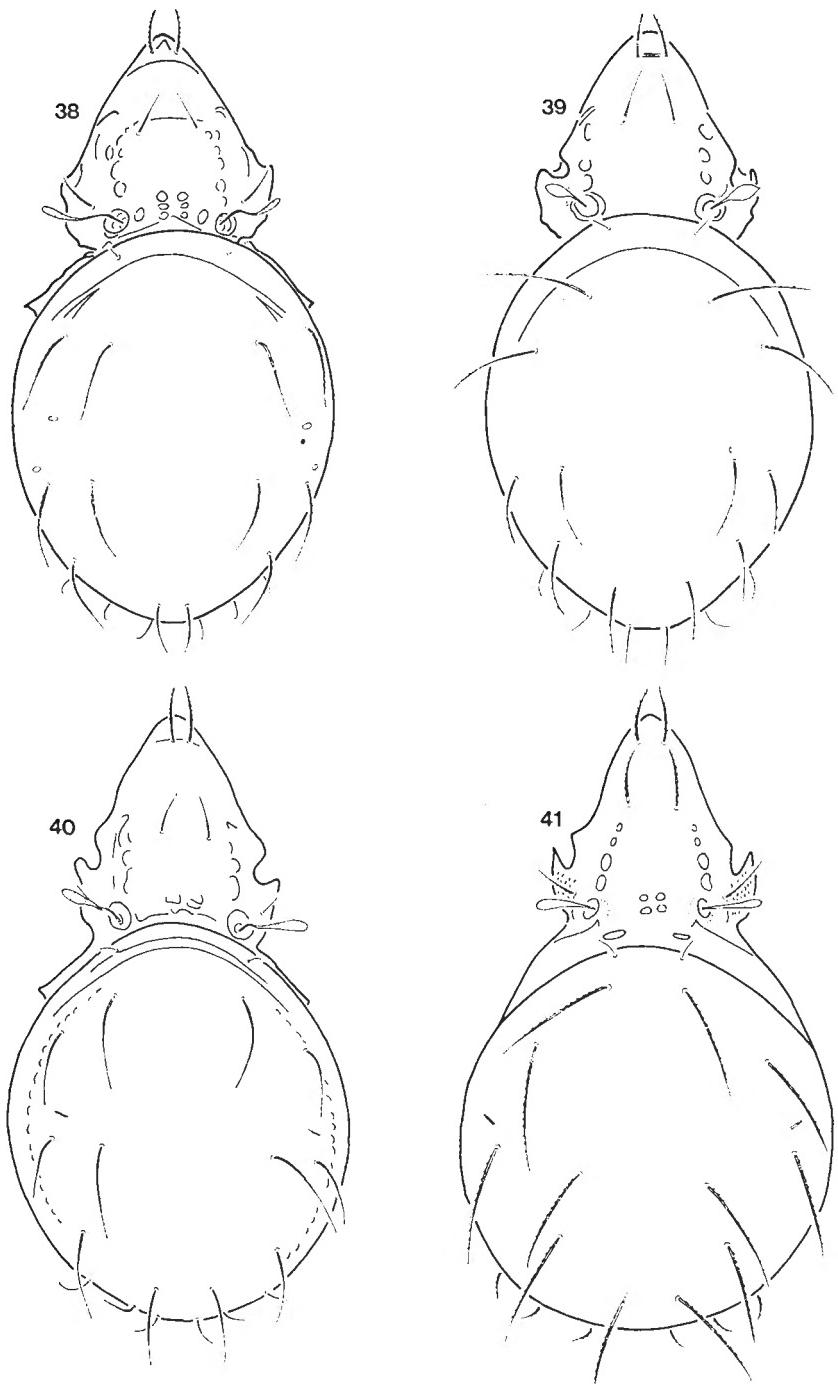


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Figs. 34 – 37. 34: *Amerioppia interrogata* MAHUNKA, 1976; 35: *A. minima* HAMMER, 1961; 36: *A. rudentigera* HAMMER, 1961; 37: *A. hexapilis* HAMMER, 1961



Figs. 38–41. 38: *Amerioppia usiatica* HAMMER, 1977; 39: *A. senecionis* P. BALOGH, 1984; 40: *A. africana* KOK, 1967; 41: *A. similis* COVARRUBIAS, 1967

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